IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please AMEND claims 1, 14, 15, 17, and 21-24 in accordance with the following:

1. (CURRENTLY AMENDED) An optical device comprising:

an optical path provided between an input port, which is connected to a first optical fiber, and to which signal light modulated at a frequency f_s is supplied, and an output port; and

an optical loop optically coupled to said optical path;

said optical loop including:

an optical amplifier for compensating for a loss in said optical loop so that laser oscillation of a continuous wave having a wavelength λ_c occurs in said optical loop;

an adjuster for adjusting an optical path length of said optical loop so that said frequency f_s becomes equal to an integral multiple of the reciprocal of a recirculation period of said optical loop;

an optical bandpass filter that allows light having said wavelength λ_c to pass; and

a nonlinear optical medium for mode-locking said laser oscillation according to said signal light,

wherein said nonlinear optical medium includes a second optical fiber to which said signal light of said input port is inputted from said optical loop, and said continuous wave having said wavelength λ_c is inputted from said optical loop, and generates amplitude modulated CW light having said wavelength λ_c different from an idler light and including a component of said frequency f_s by performing amplitude modulation of said continuous wave based on four-wave mixing by two lights between the signal light and the continuous wave generated by the laser oscillation using said signal light as pump light, and

wherein pulses including said wavelength λ_c are generated by said nonlinear optical medium and output through the output port, and a wavelength λ_s of said signal light of said input port is different from said wavelength λ_c of said continuous wave.

2. (CANCELED).

3. (PREVIOUSLY PRESENTED) An optical device according to claim 1, further comprising an optical coupler for optically coupling said optical path and said optical loop, said optical coupler providing a part of said optical path and a part of said optical loop.

4-5. (CANCELED).

6. (ORIGINAL) An optical device according to claim 1, wherein said nonlinear optical medium comprises a single-mode fiber.

7. (ORIGINAL) An optical device according to claim 1, wherein said nonlinear optical medium comprises a highly nonlinear dispersion shifted fiber.

8. (PREVIOUSLY PRESENTED) An optical device according to claim 6, wherein said nonlinear optical medium has a zero dispersion wavelength substantially equal to the wavelength of said signal light.

9. (ORIGINAL) An optical device according to claim 1, further comprising an input optical amplifier optically connected to said input port for amplifying said signal light.

10-11. (CANCELED).

12. (ORIGINAL) An optical device according to claim 1, further comprising a waveform shaper optically connected to said output port for performing waveform shaping of said signal light according to an optical clock output from said output port.

13. (ORIGINAL) An optical device according to claim 12, wherein said waveform shaper comprises a nonlinear optical loop mirror.

14. (CURRENTLY AMENDED) A system comprising:

a first optical fiber for transmitting signal light modulated at a frequency f_s; and

an optical device connected to said first optical fiber;

said optical device including:

an optical path provided between an input port, which is connected to said first optical fiber, and to which said signal light is supplied, and an output port;

an optical loop optically coupled to said optical path;

said optical loop including:

an optical amplifier for compensating for a loss in said optical loop so that laser oscillation of a continuous wave having a wavelength λ_c occurs in said optical loop;

an adjuster for adjusting the optical path length of said optical loop so that said frequency f_s becomes equal to an integral multiple of the reciprocal of a recirculation period of said optical loop;

an optical bandpass filter that allows light having said wavelength λ_c to pass; and

a nonlinear optical medium for mode-locking said laser oscillation according to said signal light,

wherein said nonlinear optical medium includes a second optical fiber to which said signal light of said input port is inputted from said optical loop, and said continuous wave having said wavelength λ_c is input from said optical loop, and generates amplitude modulated CW light having said wavelength λ_c <u>different from an idler light</u> and including a component of said frequency f_s by performing amplitude modulation of said continuous wave based on four-wave mixing <u>by two lights</u> between the signal light and the continuous wave generated by the laser oscillation using said signal light as pump light, and

wherein pulses including said wavelength λ_c are generated by said nonlinear optical medium and output through the output port, and a wavelength λ_s of said signal light of said input port is different from said wavelength λ_c of said continuous wave.

15. (CURRENTLY AMENDED) A system comprising:

a first optical fiber transmission line for transmitting signal light; and

at least one optical repeater arranged along said optical fiber transmission line;

each of said at least one optical repeater including:

an optical clock regenerator for regenerating an optical clock by mode locking of laser oscillation according to said signal light; and

a waveform shaper for performing waveform shaping of said signal light according to said optical clock regenerated by said optical clock regenerator,

said optical clock regenerator including:

an optical path provided between an input port, which is connected to said first optical fiber, and to which signal light modulated at a frequency f_s is supplied, and an output port; and

an optical loop optically coupled to said optical path;

said optical loop including:

an optical amplifier for compensating for a loss in said optical loop so that laser oscillation of a continuous wave having a wavelength λ_c occurs in said optical loop:

an adjuster for adjusting an optical path length of said optical loop so that said frequency f_s becomes equal to an integral multiple of the reciprocal of a recirculation period of said optical loop;

an optical bandpass filter that allows light having said wavelength λ_c to pass; and

a nonlinear optical medium for mode-locking said laser oscillation according to said signal light,

wherein said nonlinear optical medium includes a second optical fiber to which said signal light of said input port is inputted from said optical loop, and said continuous wave having said wavelength λ_c is inputted from said optical loop, and generates amplitude modulated CW light having said wavelength λ_c <u>different from an idler light</u> and including a component of said frequency f_s by performing amplitude modulation of said continuous wave based on four-wave mixing <u>by two lights</u> between the signal light and the continuous wave generated by the laser oscillation using said signal light as pump light, and

wherein pulses including said wavelength λ_c are generated by said nonlinear optical medium and output through the output port, and a wavelength λ_s of said signal light of said input port is different from said wavelength λ_c of said continuous wave.

16. (ORIGINAL) A system according to claim 15, wherein said waveform shaper comprises a nonlinear optical loop mirror.

17. (CURRENTLY AMENDED) A method comprising:

(a) generating laser oscillation of a continuous wave having a wavelength λ_c in an optical loop including as a nonlinear optical medium;

(b) introducing a signal light modulated at a frequency f_s into said optical loop from a first optical fiber;

(c) adjusting the optical path length of said optical loop so that said frequency f_s becomes equal to an integral multiple of the reciprocal of a recirculation period of said optical loop;

(d) regenerating an optical clock by mode-locking said laser oscillation according to said signal light; and

(e) allowing light of said wavelength λ_c to pass;

wherein said step (d) generates amplitude modulated CW light having said wavelength λ_c

different from an idler light and including a component of said frequency f_s by performing amplitude modulation of said continuous was based on four wave mixing by two lights between the signal light and the continuous wave generated by the laser oscillation using said signal as pump light, and

wherein pulses including said wavelength λ_c are generated by said nonlinear optical medium and output through the output port, and a wavelength λ_s of said signal light of said input port is different from said wavelength λ_c of said continuous wave.

18. (PREVIOUSLY PRESENTED) An optical device according to claim 7, wherein said nonlinear optical medium has a zero-dispersion wavelength substantially equal to the wavelength of said signal light.

19. (PREVIOUSLY PRESENTED) An optical device according to claim 1, wherein said second optical fiber comprises a highly-nonlinear dispersion shifted fiber, and a nonlinear refractive index of said second optical fiber is equal to or larger than $5x10^{-20}$ m^2/W.

20. (PREVIOUSLY PRESENTED) An optical device according to claim 1, wherein said second optical fiber comprises a highly-nonlinear dispersion shifted fiber, and a mode field diameter of said second optical fiber corresponding to an effective core area is equal to or less than 4μm.

21. (CURRENTLY AMENDED) An optical device according to claim 1, wherein said second optical fiber comprises a plurality of small sections, said plurality of said small sections being connected in such an order that adjacent small sections have similar zero-dispersion wavelengths, each small section ~~being shorter than one kilometer~~ having a length which is hundreds of meters or less.

22. (CURRENTLY AMENDED) A system according to claim 14, wherein said second optical fiber comprises a plurality of small sections, said plurality of said small sections being connected in such an order that adjacent small sections have similar zero-dispersion wavelengths, each small section ~~being shorter than one kilometer~~ having a length which is hundreds of meters or less.

23. (CURRENTLY AMENDED) A system according to claim 15, wherein said

second optical fiber comprises a plurality of small sections, said plurality of said small sections being connected in such an order that adjacent small sections have similar zero-dispersion wavelengths, each small section ~~being shorter than one kilometer~~ having a length which is hundreds of meters or less.

24. (CURRENTLY AMENDED) A method according to claim 17, wherein said nonlinear optical medium includes an optical fiber to which said signal light is inputted from said optical loop, and said optical fiber optical fiber comprises a plurality of sections, said plurality of said sections being connected in such an order that adjacent sections have similar zero-dispersion wavelengths, each section ~~being shorter than one kilometer~~ having a length which is hundreds of meters or less.

25. (PREVIOUSLY PRESENTED) An optical device according to claim 21, wherein fiber sections among said plurality of said small sections have a smaller variation in zero-dispersion wavelength near an end of said second optical fiber, to which end said signal light is input.

26. (PREVIOUSLY PRESENTED) A system according to claim 22, wherein fiber sections among said plurality of said small sections have a smaller variation in zero-dispersion wavelength near an end of said second optical fiber, to which end said signal light is input.

27. (PREVIOUSLY PRESENTED) A system according to claim 23, wherein fiber sections among said plurality of said small sections have a smaller variation in zero-dispersion wavelength near an end of said second optical fiber, to which end said signal light is input.

28. (PREVIOUSLY PRESENTED) A method according to claim 24, wherein fiber sections among said plurality of said small sections have a smaller variation in zero-dispersion wavelength near an end of said optical fiber, to which end said signal light is input.